



# **OIL HEATING**

**WHAT IT MEANS  
TO THE ARCHITECT**

**WILLIAMS OIL-O-MATIC HEATING CORP.  
BLOOMINGTON, ILLINOIS**

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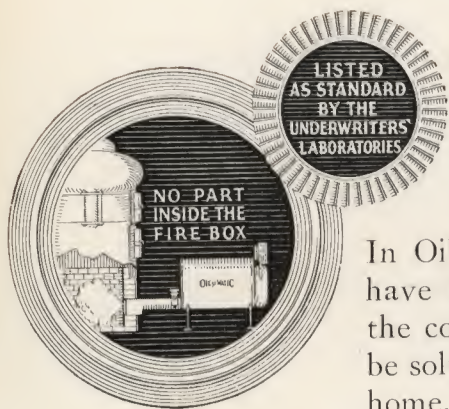
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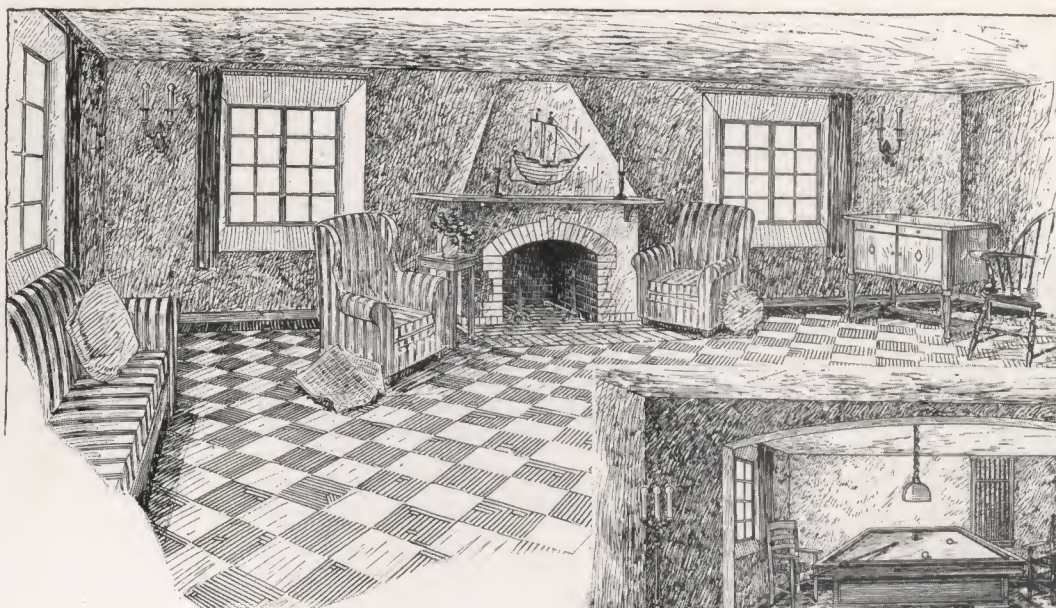
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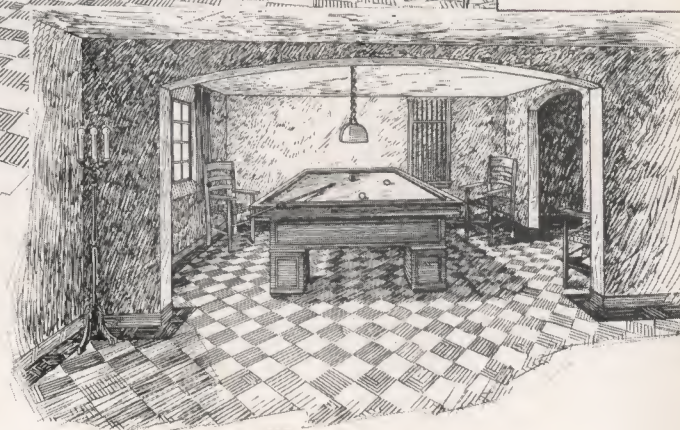
In Oil Heating, many architects have found a solution to some of the common problems that must be solved in the planning of every home.

A brief survey of the far reaching effects of Oil Heating, from the architects' point of view, therefore is of interest.

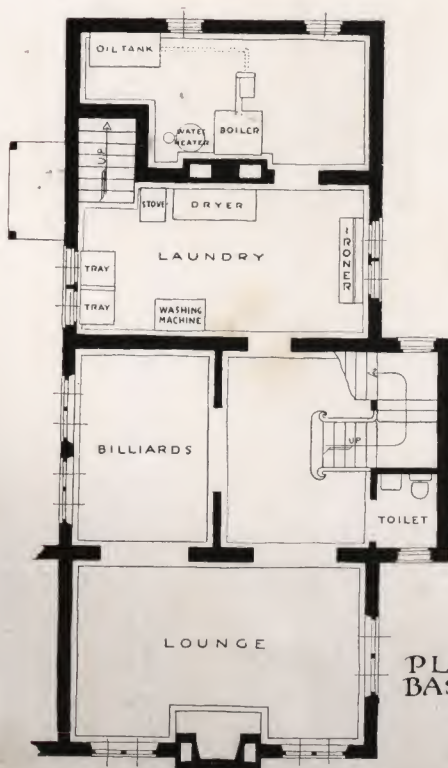
This, with the story of an oil burner that has been demonstrated to be an absolutely reliable and automatic source of heat, is contained in the pages that follow.



THE LOUNGE



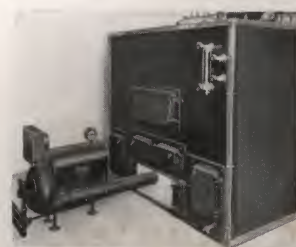
BILLIARD ROOM

PLAN OF  
BASEMENT

This plan shows a very practical use of typical basement, such as will be found under thousands of houses.

Complete household mechanical equipment is arranged for, yet this basement includes recreation rooms that would be welcome in most homes, particularly where there are young people in the family.

An attractive stairway leads down to the Lounge and Billiard room from the entrance hall above.



## Oil Heating and the Architect's Problems

THE convenient, easy and economical heating of the house contributes more perhaps to the thorough enjoyment of the home, than any other single factor. Certainly nothing more vitally affects the home owner's health, his comfort and his pocketbook.

The benefits of oil heating, however, are not confined to the home owner. Architects have found in oil-heating a solution to some of the common problems that must be solved in the planning of every home—Beauty—Comfort and Convenience—Equipment Efficiency and last but not least—Construction Costs.

A brief survey of the far reaching effects of oil heating, from the architects' point of view, therefore is of interest.

### How Oil Heating Affects Plans and Construction Costs

The architects' appreciation of the advantages of oil heating will often first be experienced in the preliminary stages of the planning of a house, for the oil fired heating plant may now be located with even less thought than is given the kitchen range.

The full utilization of the basement, which constitutes 33⅓% of the available space within the four walls of the house, is permitted for fuel storage, ashes and their attendant dust and dirt are eliminated from consideration, and the laundry and heating plant equipment may be combined in a single room.

Oil heat therefore can readily be made a source of economy, by permitting the use of this space for much needed additional rooms. Instead of increasing the size of the proposed new home, it often may actually be made smaller, because of this additional usable ground floor space.

If that is not desired, a very practical reduction in the size of the basement is easily permitted, by limiting the basement to the combined laundry and boiler room. A substantial saving will then result from the reduction in the cost of the excavation required and the cost of basement walls, floors, window sashes, doors and interior finish.

The basement illustrated on the opposite page may serve as a typical example.

As presented, it contains 9300 cubic feet. Had that basement consisted of the combined laundry and boiler room only—the content would be reduced by 6540 cubic feet—the foundation cost by 50%—the floor by 75%—and the cost of a fireplace, stair, toilet, eight basement sash and two doors would have been eliminated. These struc-

*A luxury, once restricted to the more pretentious residence is now available in the average house.*

*The basement interiors illustrated are intended to merely suggest the ease with which otherwise wasted space in the modest home can be put to enjoyable and practical use.*

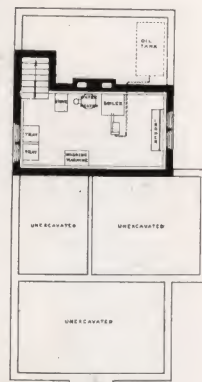
tural savings alone would reduce the cost of this basement by at least 40—45% yet—the usefulness of the basement would be in no way impaired for with Oil Heating, it is entirely practical to assemble all mechanical equipment in a single room, as illustrated. In large houses, the savings that

can be effected in this way assume appreciable proportions.

The possibilities in this phase of the planning of a house will be appreciated by the architect and experienced builder who daily is confronted with the problem presented by current high building costs.

Better basements also are easily planned with oil heat, due to the flexibility with which the heating plant may be located.

The following sketch reveals how oil heating would have enlarged the laundry by almost one-third and made it a more pleasant workshop, by permitting windows on three sides of the room.



A basement as originally planned (left). Alteration and improvement of same basement plan, permitted by Oil Heating (right).

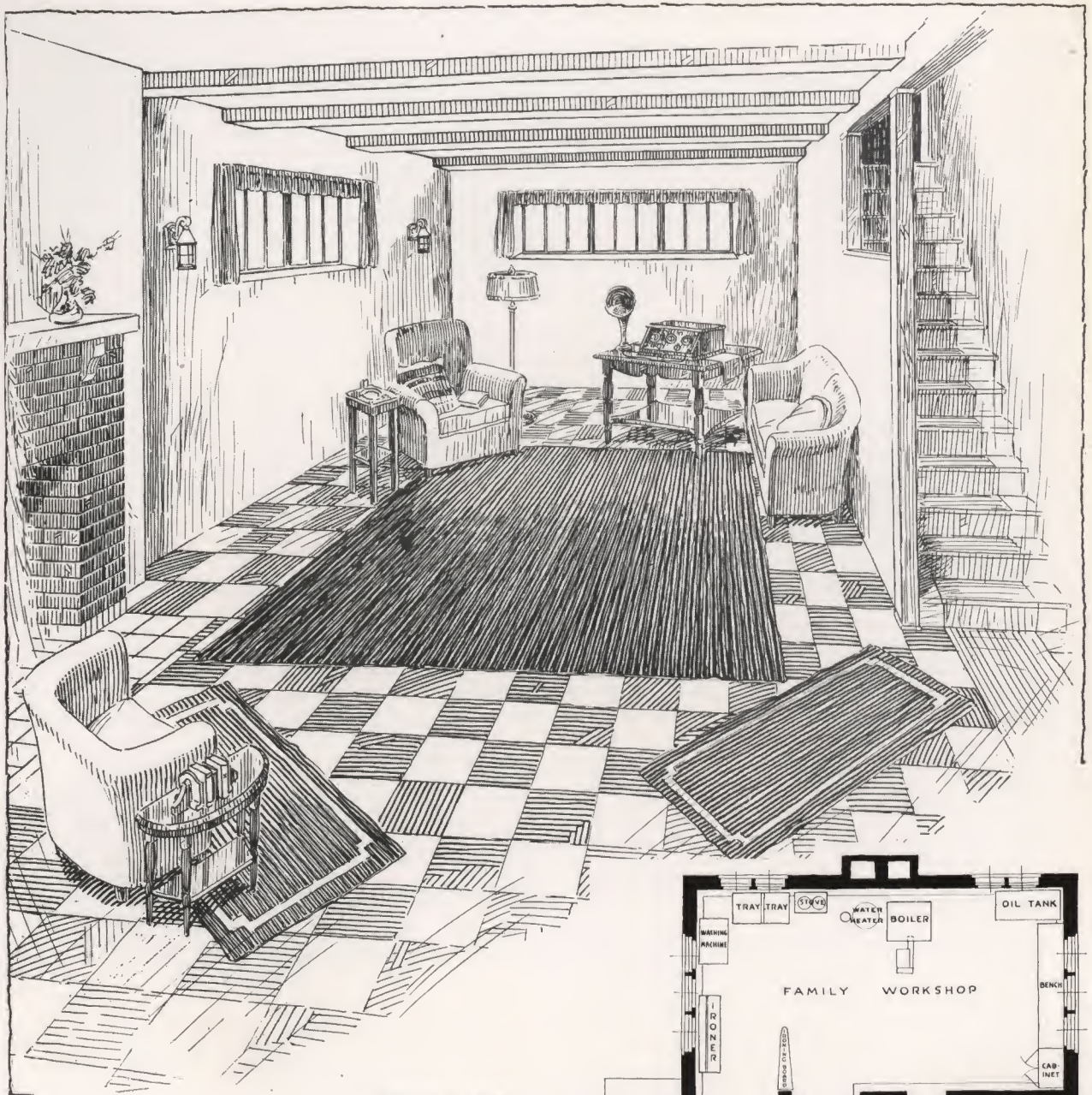
With the plan of the house disposed of, the interesting details of interior decorations naturally come up for consideration.

### Oil Heating and the Beauty of the Home

The creation of beautiful interiors is the architects' problem. Their preservation, the housewife's task.

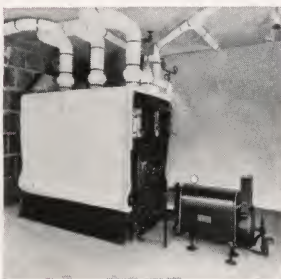
And what a task it has been with coal, ashes, smoke and soot to contend with.

Oil Heating forever removes those most important sources of dirt within the house. The artistic ability of the architect consequently may be exercised without restraint in the creation of beautiful interiors, for with oil heating, those unavoidable limitations of the past are no longer an important factor to reckon with. The familiar hazy blue smudge on woodwork and windows is relegated to the past. Curtains and draperies need



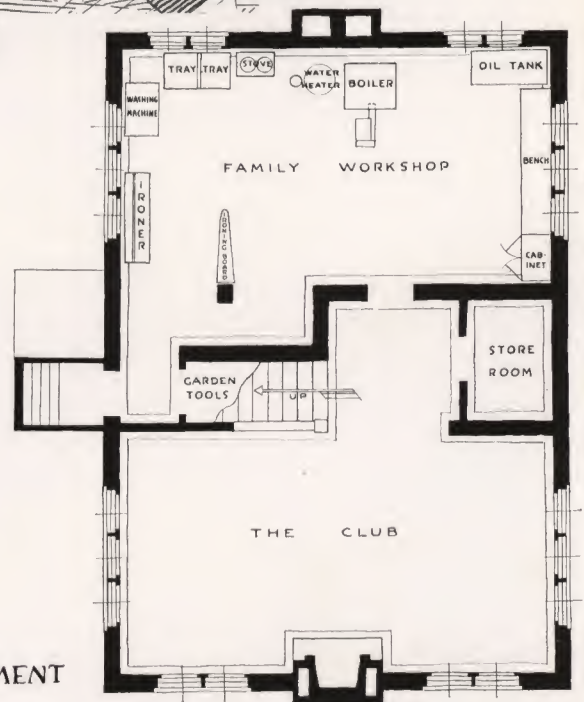
### THE CLUB

Here is an attractive yet inexpensive utilization of space which ordinarily is wasted. It compels no sacrifice in the completeness of the household mechanical equipment in the basement.



PLAN OF BASEMENT

1 2 3 4 5



be cleaned but half as often. Wall paper and wall decorations remain unsoiled. Cleaning and dusting is no longer a daily task. So housework is lightened.

Yet a beautiful house may not be a home, for today—"Home" implies "Comfort"—in the extreme sense of the word.

### Comfort and Convenience

Oil Heating can contribute more perhaps to complete satisfaction with the home than any other single factor.

Men have never learned to enjoy tending the furnace. No shovel was ever made to fit a woman's hand. Women like even less, the dirt and dust that comes from the most carefully tended furnace room.

With oil heating, the early morning and last thing at night tending of fires is eliminated. To the older folks and the wife who must spend much of their time alone at home, oil heating is indeed a blessing. For they are relieved of all thought and care of the heating plant. A furnace man never need enter the basement. And the removal of ashes—always a distasteful task—is gone forever.

Evenings, week ends, holidays, in fact extended visits away from home, may be enjoyed any time. Oil heating faithfully provides the only essential care the house requires during cold weather.

Any desired temperature is automatically maintained with oil heating—regardless of weather conditions. So during the fluctuating weather of fall and spring, oil heating is especially appreciated. A cool spell automatically brings the heat that is so welcome, tho it be needed for but a few hours or a day or two. Then later on dark winter mornings, when the temperature is flirting with zero, the once harassed keeper of the furnace gets an extra half hour of sleep and dresses in a warm room.

That's automatic heating. That's comfort. But the beneficial effects of uniform non-fluctuating temperatures on the health, are of even greater importance.

According to C. N. Bundeson M.D. Director Chicago Board of Health—grave dangers lurk in chilly rooms. Frequent changes in room temperatures and cold floors are the cause of many colds. If the suffering and after effects of common colds could be calculated, colds would rank among the important respiratory diseases, for in their wake come influenza, bronchitis, laryngitis, ear and mastoid infections, pneumonia and even death...many diseases of childhood particularly start with a common cold.

With OIL-O-MATIC heat, room temperatures vary less than two degrees.

Such comforts are a blessing in disguise, how-

ever, for they result from the most efficient and economical operation of the heating plant.

### Heating System Efficiency

Inexpert intermittent hand firing of a heating plant is inefficient and wasteful. Firing periods usually result from a need for heat. Forcing fires to obtain quick heat is costly because both excessive fuel and draft are usually employed. This causes poor combustion and carries a large volume of heat up the chimney. Yet hand firing of a heating plant by the unskilled, inevitably leads to alternating periods of heat followed by cool spells and an incessant repetition of that process.

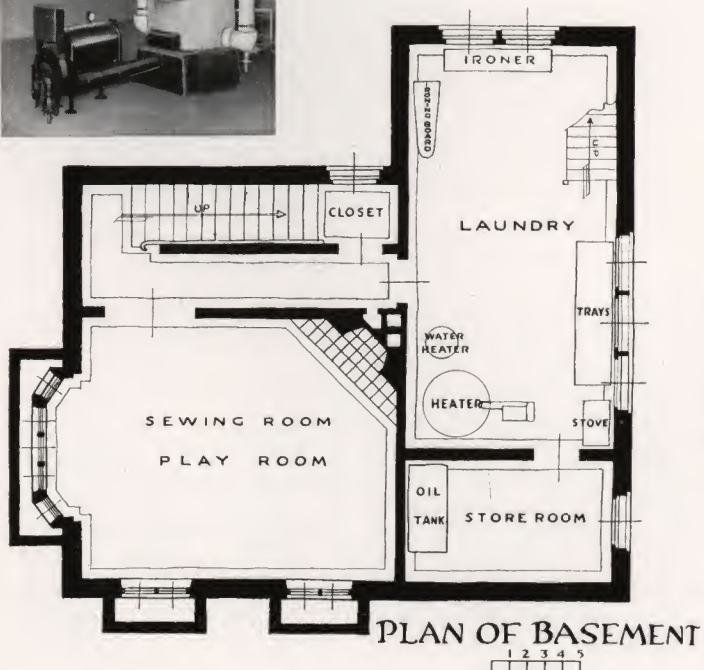
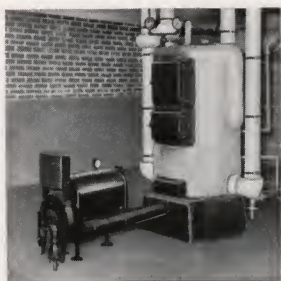
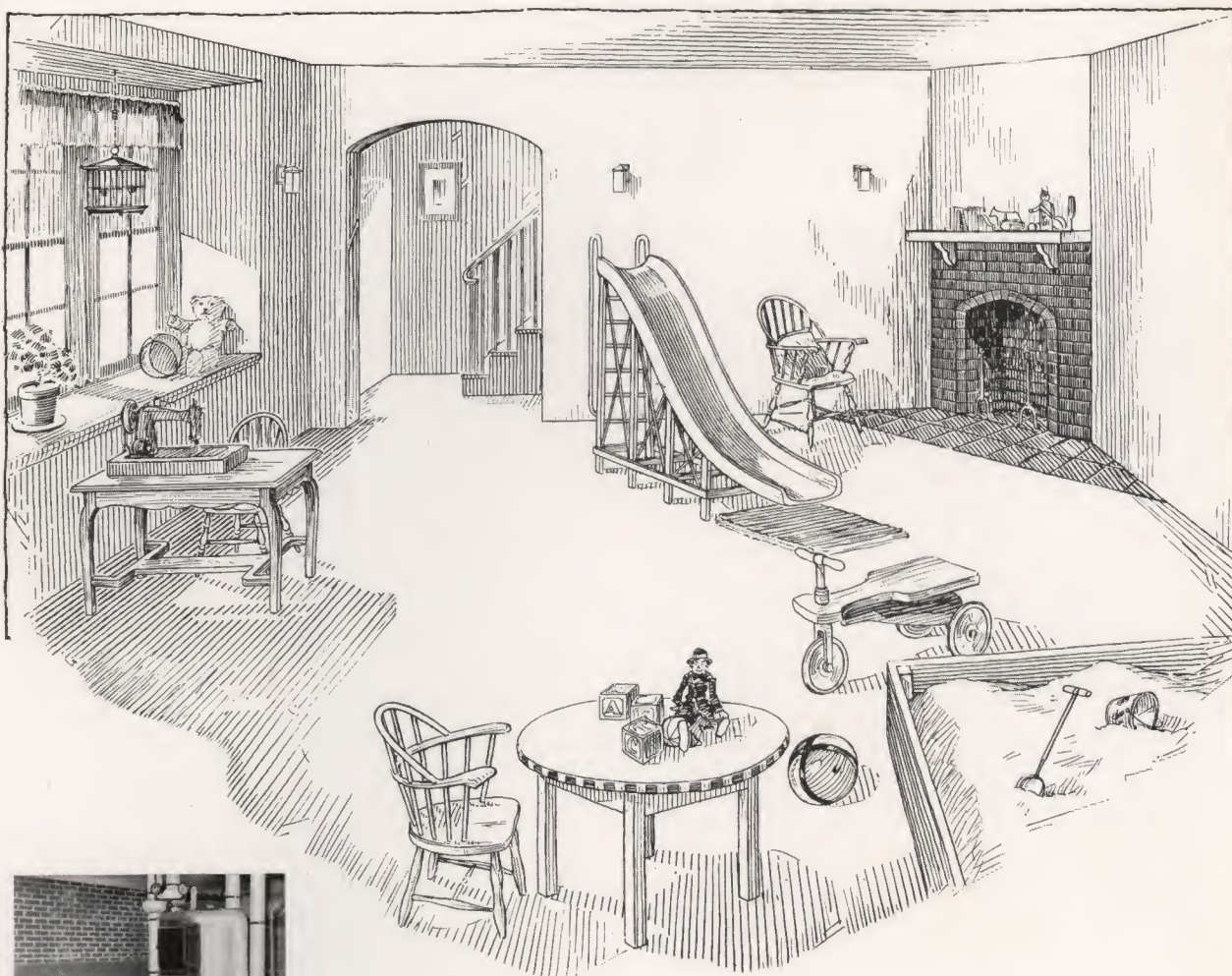
With an OIL-O-MATIC, forcing fires is eliminated. The heating plant is uniformly operated at full efficiency, for such periods as are necessary to maintain the desired temperature. Temperatures are jointly controlled by the room thermostat and heating plant controls. OIL-O-MATIC operates only to satisfy those controls. Such operation requires a minimum of fuel.

Among other important factors affecting heating plant efficiency, none is more important than clean flues or gas passages. All heating engineers know that  $\frac{1}{8}$  inch of soot will decrease boiler efficiency, by as much as 25%. Power plant operators insure clean flues by installing soot blowers. Domestic boiler manufacturers recognize its importance—if the boiler is fired with coal—and recommend as necessary, the cleaning of the gas passages or flues once each week. In spite of this, the importance of a clean boiler is not generally recognized by the inexpert. Cleaning a boiler is a dirty job—it consequently is neglected. The difficulty in cleaning many domestic heating plants explains why once a year, instead of once a week, is a common practice. Many are never cleaned.

The loss that results from neglect of that task is entirely eliminated by an OIL-O-MATIC, for the fuel oil is completely consumed and produces no soot or smoke. Heat absorption is not retarded. Full rated boiler efficiency is made possible.

### Cost of Oil Heating

The cost of heating with oil is of universal interest. Usually the inquirer asks about "the cost as compared with coal," overlooking the fact that the cost of coal and the cost of heating with coal are two quite different things. From what precedes it should be apparent that the cost of tending a coal fired heating plant and the expense of ash removal, which are eliminated with oil heating, must all be calculated in the total cost of heating with coal. Ashes—also cost money. Fifteen percent of the annual coal bill pays for nothing but ashes—an incombustible refuse and a dead loss in most coals.



### SEWING ROOM AND CHILDREN'S PLAYROOM

Surely a pleasant workshop and play-room is welcome in the small home.

Here the housewife's daily tasks may be dropped when necessary—the children may carelessly romp about as children will without disturbing the living rooms of the house.

A second and equally important reason that makes it difficult to draw a concise comparison between the two fuels, is the fact that one figure covers heat—the other not only heat but such intangibles as convenience, comfort and cleanliness and health insurance. Who shall put a price on these?

## Oil Heating and Domestic Hot Water Supply

With a mechanically fired and automatically controlled heating plant in the oil heated home, which provides any required heat, summer and winter, night and day; there is no reason why the one heating plant cannot be equipped to care for the **entire** heating requirements of the home—both heating and domestic hot water.

The ease with which this can be done has led to the development of a very practical and inexpensive domestic hot water supply system. It requires no attention other than maintaining the required water level in the boiler. It is simple to install. It costs but little more than the ordinary hot water storage tank. It provides an inexhaustible supply of hot water at a low cost and completely eliminates the domestic hot water heater that is usually installed.

As illustrated, this hot water heating and storage system consists essentially of a double shell tank—a storage tank within a circulating tank or outer shell. The circulating tank is connected to the boiler below the water level, so the boiling water in the boiler continuously flows to, down thru the circulating tank and back to the bottom of the boiler, thru a return. The water stored in the inner or storage tank thus is heated by and absorbs heat from the rapidly circulating boiling water in which it is submerged.

With this system, the thermostat located in one of the living rooms in the house controls the oil burner operation in conjunction with a thermostatic hot water control or aquastat, in the hot water storage tank. During the heating season, the need for either heat or hot water therefore operates the oil burner.

Thousands of installations, in service over a period of years however has revealed that certain quite definite results may be anticipated with the installation of an OIL-O-MATIC. The facts regarding OIL-O-MATIC heating costs are presented separately.

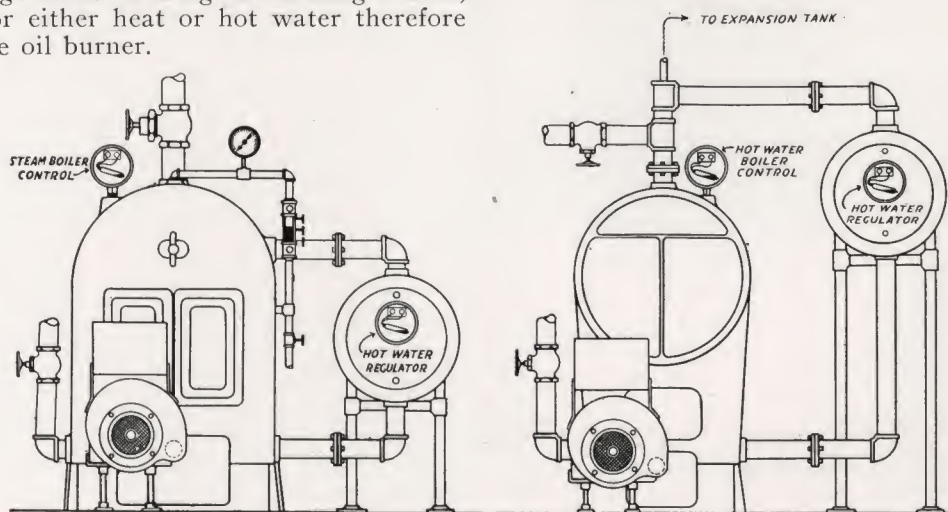
At the end of the heating season, the circulation of the steam or hot water to the radiation system is prevented by closing valves in the flow line and return. The oil burner operation then is governed by hot water requirements alone.

Frequency of oil burner operation and hours of operation per day with this hookup therefore varies with the time of the year. From a study of facts which follow (see page 14) it will be readily apparent that the fuel consumption of an OIL-O-MATIC will be low, with this hot water supply system, during warm weather.

A fully automatic house heating and domestic hot water supply system can be obtained in a similar manner, by the installation of thermostatically operated shut off valves in the flow line and return. With this installation, oil burner operation is controlled by the thermostatic controls on the boiler and the hot water storage tank. Room temperatures are then controlled by the room thermostat which opens and closes the automatic valves in the flow line and return.

If this circulating tank installation is not desired, the same general plan of heating hot water may be employed by using any of the well known circulating coil, submerged or indirect hot water heating apparatus, which transmit the heat from the hot water or steam vapor in the boiler, to the water in the hot water storage tank.

The auxiliary or safety boiler control is installed as usual to control the maximum temperature or pressure in the boiler.



(1) Steam Boiler Hook Up

(2) Hot Water Boiler Hook Up

(3) Combined House Heating and Domestic Hot Water Installation

## Oil Heating of Commercial and Industrial Buildings

Commercial and industrial buildings compel consideration of the heating problem from a slightly different point of view. Here uninterrupted and flexible service, heating plant efficiency, labor and operating costs are of paramount importance.

Due to the large quantity of fuel required to heat most commercial and industrial buildings, the cost of fuel is totaled not in hundreds, but in thousands of dollars. A small saving of even 10-15% in fuel cost hence becomes apparent at once in the fuel bill. When to this is added the cost of the labor eliminated (firemen and coal passers) and the cost of ash disposal—the total saving that results from the oil heating of commercial and industrial buildings frequently assumes proportions that cannot justifiably be ignored.

efficiently operated oil fired heating plant produces no smoke.

With these briefly outlined facts in mind, a few examples of the diversified service in which oil heating has successfully proven a solution, to some of the complex problems faced by the management of commercial and industrial buildings, may prove of interest.

### Capitol Theatre, Chicago, Ill.

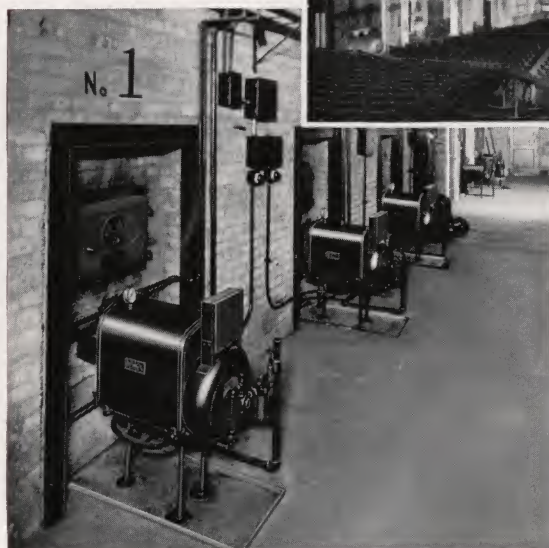
The Capitol Theatre, Chicago, is a good example of the modern application of oil heating in a large metropolitan theatre. The main auditorium and supplementary rooms total 1,749,000 cubic feet. A complete scientifically controlled warm air heating and ventilating system is installed, consisting of six furnaces.

### 1,749,000 Cubic Feet—Six Furnaces—A Steam Boiler and a Hot Water System— All Cared For by One Man

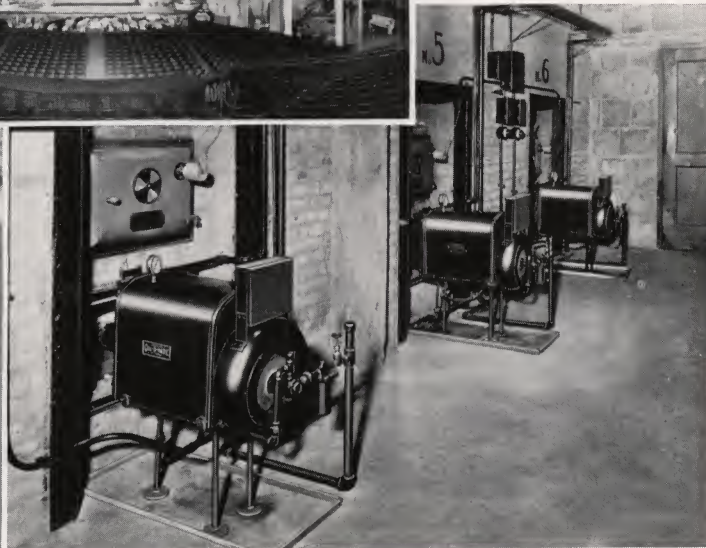
A view of the Capitol Theatre, Chicago; John Eberson, Architect, National Theatres Corp., Owners. Seating capacity 3,000. The left side of the theatre represents an Italian villa. Oppo-



site is a reproduction of an Italian garden and temple. The ceiling, a deep blue sky, full of twinkling stars and drifting clouds, creates an open air illusion that must be seen to be appreciated.



A view of the six Reynolds Oil-O-Matic fired hot air furnaces in the Capitol Theatre.



Close-up of furnaces 4, 5 and 6.

The elimination of mechanical ash handling equipment also is a factor that must be recorded to the credit of oil heating, particularly in the larger buildings.

Smoke prevention which is becoming more and more of a serious question in the larger cities is another problem quickly disposed of, for the

The experience of other operators of theatres of comparable size indicates the complete Capitol Theatre heating system would require three shifts per day of two men each, a fireman and coal passer, if coal had been used. In ordinary cold weather, the operation of three furnaces would be required and banked fires would have

to be kept in the three reserve furnaces, in anticipation of the sudden cold snap.

The engineer of the Capitol Theatre is the sole attendant of this Oil-O-Matic fired heating plant. At night, the watchman looks in on the heating plant in his regular rounds of the building.

This battery of OIL-O-MATIC fired furnaces is thermostat controlled, so as to automatically provide whatever heat is needed and normal winter weather requires the use of but three furnaces. The others stand idle, tho instantly ready

### Sunshine Apartments, Astoria, Long Island, N. Y.

This unusual apartment building project contains thirty-two separate units. They were planned with four features in mind. 1. Resale of the apartments as separate units. 2. Economy of operation. 3. Simplification of janitor service and elimination of unreliable handfiring of heating plants. 4. Control of heating by the owner of each unit.

### 192 Apartments, Heated by Thirty-two Oil-O-Matic Janitors



Sunshine Apartments, Astoria,  
Long Island, N. Y.

for the sudden development of cold weather.

This building in addition contains stores and offices, heated by a separate steam heating plant, which is also fired by two OIL-O-MATIC oil burners; and a hot water supply system which is fired by two more OIL-O-MATICS.

Ash disposal—an appreciable expense in the larger cities, has been entirely eliminated at the Capitol Theatre.

Oil storage consists of four steel tanks having a combined capacity of 8000 gallons which are located in what would have been coal storage bins.



One of the thirty-two OIL-O-MATIC fired heating units in the Sunshine Apartments.



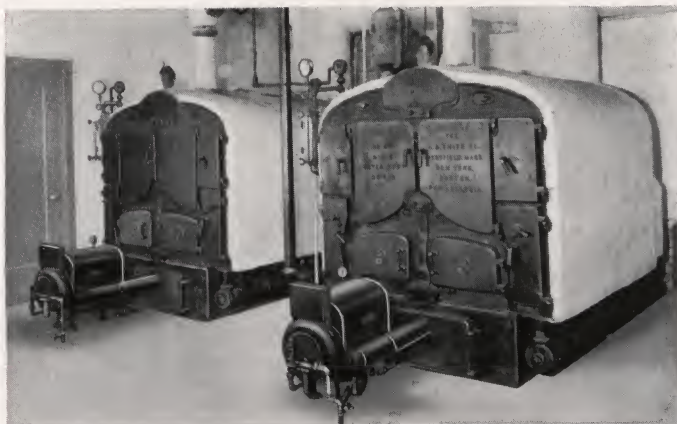
Architects { Dr. W. F. Mathews  
Lionel H. Bailey  
Builders—A. A. Mathews Co.

Each unit consequently is heated by an individual heating plant which is fired by an OIL-O-MATIC oil burner. Coal storage and ash removal were completely eliminated.

The control of the heating of each apartment unit was placed in the owner's hands, by the thermostatic control of the individual heating plant, from the owner's apartment.

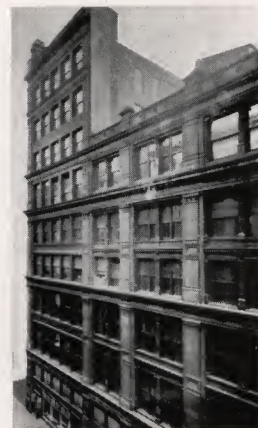
Ash disposal, of course, was entirely eliminated. Fuel supply for each heating plant consists of a 1500 gallon tank, buried under the basement floor, filled from the curb.

### A Remodelled Building and a Comparison of Heating Costs



The recently remodelled building of M. Singer & Sons, Furniture Manufacturers, New York.

Oil-O-Matic Equipped Heating Plant in M. Singer & Sons Building



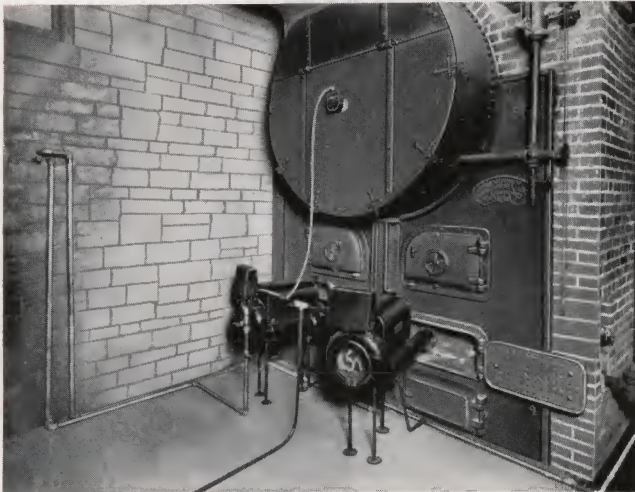
### M. Singer & Sons Building, New York, N. Y.

As this building was heated with coal before remodelling and since with oil—the management are in a position to compare costs. M. Singer & Sons report that the saving in heating cost, which followed the installation of OIL-O-MATICS approximates fifty percent and the ease with which the building is now heated exceeds their fondest expectation.

This heating plant is jointly controlled by a thermostat from the firm's offices and a Tork time clock, which shuts down the plant at 7 p.m. and starts it again at 5:30 a.m.

The boiler room is two floors below street level but oil heating eliminated all mechanical ash handling equipment and removed the subsequent expense of ash disposal.

No fireman or engineer is needed here, for the superintendent of the building gives the OIL-O-MATIC passing attention, in his daily rounds of the building, and the watchman looks in on the heating plant at night. This building contains approximately ten thousand feet of direct steam radiation, which includes heating coils in a six thousand gallon water tank on the top of the building.



The 100 H. P. Steam boiler equipped with two Model G 1800 OIL-O-MATIC Oil Burners.

### The Westminster Presbyterian Church St. Louis, Mo.

The Westminster Presbyterian Church used to find a janitor necessary during cold weather in addition to the regular attendant, whose other duties about the church were a one man job alone. No one goes near the boiler room today, since their OIL-O-MATICS were installed. Ash disposal, always a difficult and costly problem, due to the location of the heating plant, of course was entirely eliminated.

There are three distinct phases to the services

in this church that compel heating but a part of the structure at a time. Departmental control of the heating of the church consequently had to be provided.

By individual thermostatic control, heat can be obtained in any of the principal parts of the church at will.

Three thermostats, one in the permanent quarters of the church, one in the Sunday school rooms and one in the main auditorium, individually operate the heating plant as desired. The thermostat in the main auditorium is located in the pew occupied by the head of the house committee. He operates the heating plant as weather conditions and attendance necessitate.

Because of the size of the main auditorium and the variation in attendance, the heating of the Westminster Presbyterian Church had always been a problem, until the installation of Oil Heating.



The Westminster Presbyterian Church  
St. Louis, Mo.

### OIL-O-MATIC Oil Burners Are Installed in Every Type of Building

OIL-O-MATIC Oil Burners are heating every type of commercial and industrial buildings. Here the limiting factor of course is the size of the boiler installation and the radiation load.

In large buildings, a faster motor, larger fan and more liberal adjustment of the metering pump are used. Often a battery of two or more burners is installed.

Where questions exist regarding the details of OIL-O-MATIC installations in—

Stores	Schools
Theatres	Churches
Banks	Hospitals
Hotels	Clubs
Garages	Manufacturing Plants

—the counsel of OIL-O-MATIC engineers is available to all architects and engineers.

## The Principles of Oil Burning

ACCORDING to the best authorities including such men as Admiral Dyson, Kent, Harding and Willard there are four natural laws governing the efficient combustion of fuel oil. These laws are just as hard and fast as the law

of gravitation. The violation of any of these four principles inevitably leads to trouble when oil is used as a fuel. The laws are simple and easy to understand.



*Torn bits of paper light and burn easily. It is hard to light solid paper like a book.*



**Law 1. Oil must be broken up.**

**Law 1. "Oil Must Be Atomized"**—means that oil must be broken up, atomized mechanically into infinitely small particles; so fine that it floats on air like a fog. Each particle however is liquid oil. No attempt should be made to vaporize the oil, for heat is necessary to gasify any liquid. Any application of temperatures, sufficient to vaporize oil rapidly, will inevitably result in a deposition of carbon.

**Law 2. "A Fixed Minimum Quantity of Air Must Be Positively Supplied to Insure Complete Combustion and Must Be Mechanically Mixed with the Atomized Oil."**—The chemistry of the oil flame explains this law. Burning oil is a chemical process, in which oxygen in the air rapidly unites with carbon in the oil, in varying combinations at different temperatures. Carbon dioxide ( $\text{CO}_2$ ) is the chief product of combustion.

A pound of carbon will unite with  $2\frac{2}{3}$  pounds of oxygen to form  $\text{CO}_2$  and will evolve about 14,600 B.t.u. As an intermediate step, a pound of carbon may unite with  $1\frac{1}{3}$  pounds of oxygen, to form CO and evolve about 4,450 B.t.u.; but in its further conversion to  $\text{CO}_2$ , it will unite with an additional  $1\frac{1}{3}$  times its weight of oxygen and evolve the remaining 10,150 B.t.u.

Thus it is apparent that the incomplete combustion of carbon to CO, produces less than one-third the heat yielded by its complete combustion to  $\text{CO}_2$ .

Since the atmosphere is our only available source of oxygen, this law clearly indicates a fixed minimum quantity of air must be insured—and it must be mechanically mixed with the oil, so that each atom of oil is completely surrounded by air—in order to obtain the rapid and efficient combustion of the oil.



*Held this way the flame is clean and does not smoke. When a flame touches something soot is always formed.*



**Law 3. Oil must burn in mid-air.**

**Law 3. "Oil Must Be Burned in Suspension"**—that is, oil must be burned in mid-air.

If a particle of burning oil comes in contact with any heat absorbing surface, it is chilled. Its lowered temperature results in the incomplete combustion of the carbon it contains. Combustion efficiency is lowered and soot and smoke are formed.

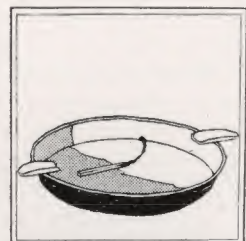
This law tells us the size of the flame must be regulated so it does not strike the walls of the combustion chamber.

**Law 4. "The Oil Must Be Burned in the Presence of a Refractory Material."**—This law is closely related to the third law. Without the assistance of reflected heat, from a refractory lining of the combustion chamber, the minimum temperature (about 1292° F.) required to consume carbon completely into  $\text{CO}_2$  gas could not always be insured, throughout the combustion zone. Refractory material therefore must be used to line the combustion chamber—not to insulate the boiler—but as a name temperature governor, so as to maintain those minimum temperatures that produce efficient, clean burning of the fuel.

How W. W. Williams applied these laws, in the OIL-O-MATIC and its installation, is explained in the pages that follow.



*A match held in the air on a pin will burn completely. It goes out when laid in an ash tray for lack of air.*



**Law 2. Oil must be mixed with air.**



*On warm days it is cool in the open air. Reflected heat makes it unbearable between big buildings.*



**Law 4. Oil burns best in reflected heat.**

## The Economic Superiority of Fuel Oil

**T**HE oil used in automatic and domestic oil burners range from kerosene, through straw colored distillate and the dark brown gas oils to the lighter grades of fuel oil. In some localities, all these oils except fuel oil, (Diesel Oil on the Pacific Coast) are known as furnace oils. They vary in cost as much as seven to ten cents per gallon, sometimes more. The heavier the oil the lower the price.

In recent years, the tremendous increase in the consumption of all petroleum products has produced many erroneous impressions, that have thrown a curtain of confusion around the facts regarding the supply and demand for fuel oil particularly. (OIL-O-MATIC burns 28° to 30° Baumé Fuel Oil.)

An appreciation of those facts is dependent upon an intelligent conception of modern refining practice.

The widespread adoption of the cracking process of refining crude oil has resulted in the obtaining of a much larger quantity of gasoline from a barrel of crude than formerly was possible. As the ratio of gasoline obtained by this process increases, the ratio of kerosene and distillates decreases; for the cracking process consists essentially of a re-arrangement of the hydro-carbons of the light fractions of the crude, under pressure. Even with this modern refining process, however, about the same physical volume of fuel oil and gasoline is obtained from crude—for fuel oil in a sense is an unavoidable secondary product of

the modern refining process.

With these facts in mind, it is apparent the production of fuel oil keeps step with gasoline production.

The significance of this situation is recognized by the Bureau of Mines which does not even carry statistics on the supply of distillate.

Their figures regarding the supply of fuel oil, however, are enlightening. The demand for all petroleum products during the war was unprecedented. On December 31, 1917, our reserve supply of fuel oil aggregated 577,899,112 gallons. The war ended and 1918 closed with a reserve supply of 659,001,357 gallons of fuel oil. On January 1, 1925, our reserve supply of fuel oil amounted to 1,670,488,924 gallons, the largest in the history of the industry. In spite of the tremendous increase in the consumption of all petroleum products; recent years have witnessed an uninterrupted increase in the reserve supply of fuel oil. That domestic consumption is a small factor is revealed by U. S. Government figures for 1923, which show less than one-half of one percent used for domestic heating.

Availability and supply of fuel oil however, are but a part of the economic justification for its use in domestic oil heating plants.

The following table taken from "Fuel Oil in Industry" by Stephen O. Andros, A.B., E.M., shows that kerosene gives the least heat, though it costs the most.

Grade Oil	Specific Gravity	Baume Gravity	Heat Units per Gallon
Kerosene	0.811	42-44°	132.858
Distillate	0.831	38-40°	136.887
Gas Oil	0.854	34-36°	138.926
Fuel Oil (for OIL-O-MATIC)	0.886	28-30°	141.790

These facts clearly indicate that consideration of domestic oil burner equipment must be confined to oil burners, which operate efficiently on fuel oil.

### Regarding the Selection of an Oil Burner

Domestic oil burners may be classified into one of three groups. Each group is defined by the character of the fuel with which the oil burner operates efficiently.

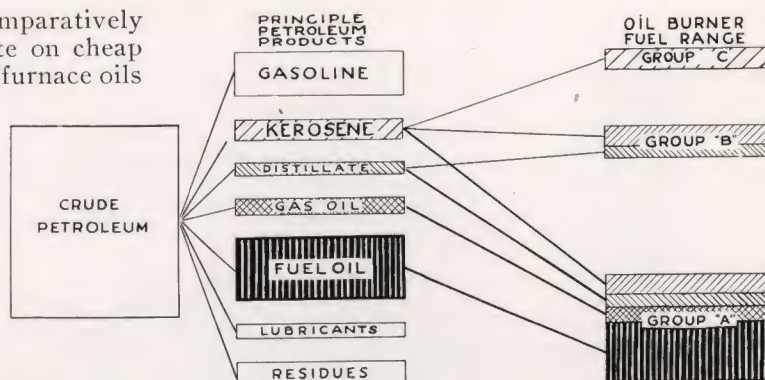
Group "C" consists of many different makes of burners, most of which are manually operated gravity feed burners. They do not atomize—but vaporize the fuel—transform it into a gas, with some form of gas generator located in the fire box of the boiler or furnace. Most of these burners employ neither forced draft nor controlled draft. These operations conflict directly with the principles of oil burning and in addition, limit the burner to the use of the lighter and the most costly fuel—kerosene.

Group "B" consists of some fully automatic makes of oil burners which preheat, vaporize and then burn the fuel in a fire pot or similar apparatus, located in the combustion chamber of the boiler. They do not line the combustion chamber with fire brick. Such operations conflict directly with the principles of oil burning. Some form of valve regulation of the liquid fuel is employed which necessitates readjustment of the oil burner with every change of fuel.

Many of these oil burners operate quite satisfactorily but they are restricted to the use of the more volatile, high priced fuels—kerosene and the light distillates.

Group "A" consists of those comparatively few makes of oil burners that operate on cheap fuel oil, but which also burn any other furnace oils local supply or market conditions may make it advisable to use. No premium is paid for low fuel cost and wide range of fuel supply however for these oil burners cost no more than many burners which are limited to the use of the high priced fuels.

The OIL-O-MATIC is the outstanding oil burner in this group. It has been proved in more installations than any other automatic oil burner. The OIL-O-MATIC is approved by the National Board of Underwriters to burn cheap 28° Baume' fuel oil or any lighter fuel. The OIL-O-MATIC and its installation complies strictly with all the principles of oil burning. No part of the OIL-O-MATIC is inside the fire box. In the OIL-O-MATIC is found the **only** device that successfully



permits the burning of fuel oil, gas oil, distillate or kerosene at will, without change in adjustments.

These, with other exclusive and superior mechanical features, explain why OIL-O-MATIC is the inevitable choice of intelligent investigation.

## Oil-O-Matic Heating Costs

No algebraic formula exists that will accurately estimate the cost of fuel for a heating season with an OIL-O-MATIC, because of the extreme variation in the many factors which affect fuel consumption. The degree of warmth desired by the occupants of the building—outside weather conditions—structural conditions affecting heat losses and the efficiency of the heating plant are all variables, which cannot be readily predetermined. Also, in an OIL-O-MATIC heated home particularly, the anticipated heat requirements of its occupants are usually exceeded, due to the ease with which heat is obtained, whenever it is desired.

Experience over a period of years with thousands of OIL-O-MATIC installations however has revealed that in practical every day service in the average heating system, where hard coal has been used, OIL-O-MATIC heating will be

productive of a distinct saving. With an efficient heating system, regardless of the fuel previously used, a saving in favor of OIL-O-MATIC heating is usually assured.

In large houses and in commercial and industrial buildings, when the saving in labor required by the coal fired heating plant, when the elimination of ash and coal handling labor and equipment, when the cost of ash disposal and the saving in storage space resulting from the elimination of coal are considered—a distinct and marked economy in the favor of oil heating usually results from the use of OIL-O-MATIC.

And those intangibles—the comfort, convenience, cleanliness and health insurance that result from OIL-O-MATIC heating—are advantages the value of which most owners frankly admit, surpass any dollar and cents computation.

"Last year my heating bill was \$692.57. This year my oil bill is \$480.97."—HARRY LAWRIE A.I.A. OIL-O-MATIC Owner, Omaha, Nebr.

"Up to the present time my oil bill is less than my coal bill would have been, but if oil cost as much, I would not go back to coal."—D. L. MACDOWELL, OIL-O-MATIC Owner; Pres. Marvel Clutch Co., Milwaukee, Wis.

"I have a large house, seventeen rooms \* \* \* you told me the expense of operation would be ten to fifteen per cent

more than coal \* \* \* the cost of operation has been less than with coal, to say nothing of the comfort and convenience we obtain from our OIL-O-MATIC."—G. W. CURTIS, OIL-O-MATIC Owner; Chairman, Dime Saving & Trust Co., Peoria, Ill.

"Frankly, the burner has already paid for itself in two seasons and we would not return to coal at any cost."—W. W. SNOW, OIL-O-MATIC Owner; Ford Dealer, Oak Park, Ill.

## OIL-O-MATIC Operating Efficiency

The following excerpts from a report of A. H. Hansen, Efficiency Engineer, Metropolitan Utilities, City of Omaha, pertain to a test run on an OIL-O-MATIC Oil Burner in a hot air furnace in a private residence in Omaha.

"The burner was tested for fuel consumption, gas consumption for ignition and the flue gases were analyzed to determine combustion efficiency. \* \* \* In this test, atmosphere temperature was 29° F., the house was maintained at 72° F. The burner operated 22% of the time.

Analysis of escaping gases was as follows:

CO<sub>2</sub>—12.2%    0—4.4%    CO—none

The flue and combustion chamber was entirely free of soot. \* \* \* An oil burner must be very efficient to obtain such results, which are seldom excelled in the best regulated boiler rooms."

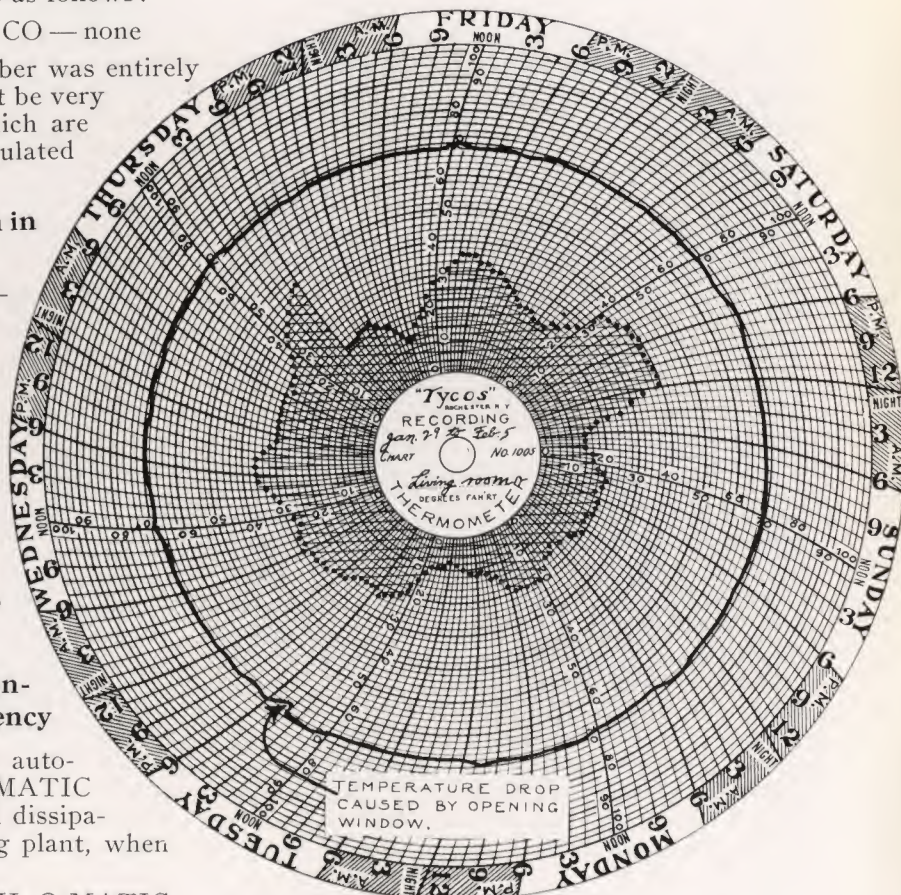
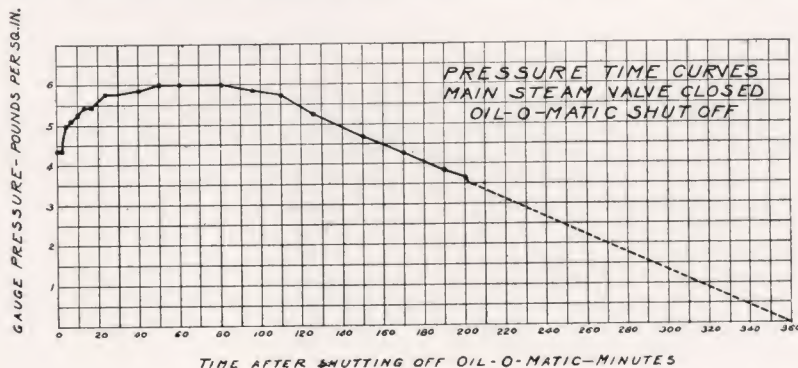
### Less Than Two Degrees Variation in Temperature all Winter

This chart is a record of the temperatures maintained in a Detroit residence during the week of January 29-February 5, 1925. The inner shaded area is a record of outside temperatures which ranged from 8° F. above zero to 46° F. above. With the exception of one drop in temperature caused by the opening of a window near the recording thermometer, it will be noted the room temperatures in this house vary less than 2° F.

### How the OIL-O-MATIC Draft Control Affects Heating Plant Efficiency

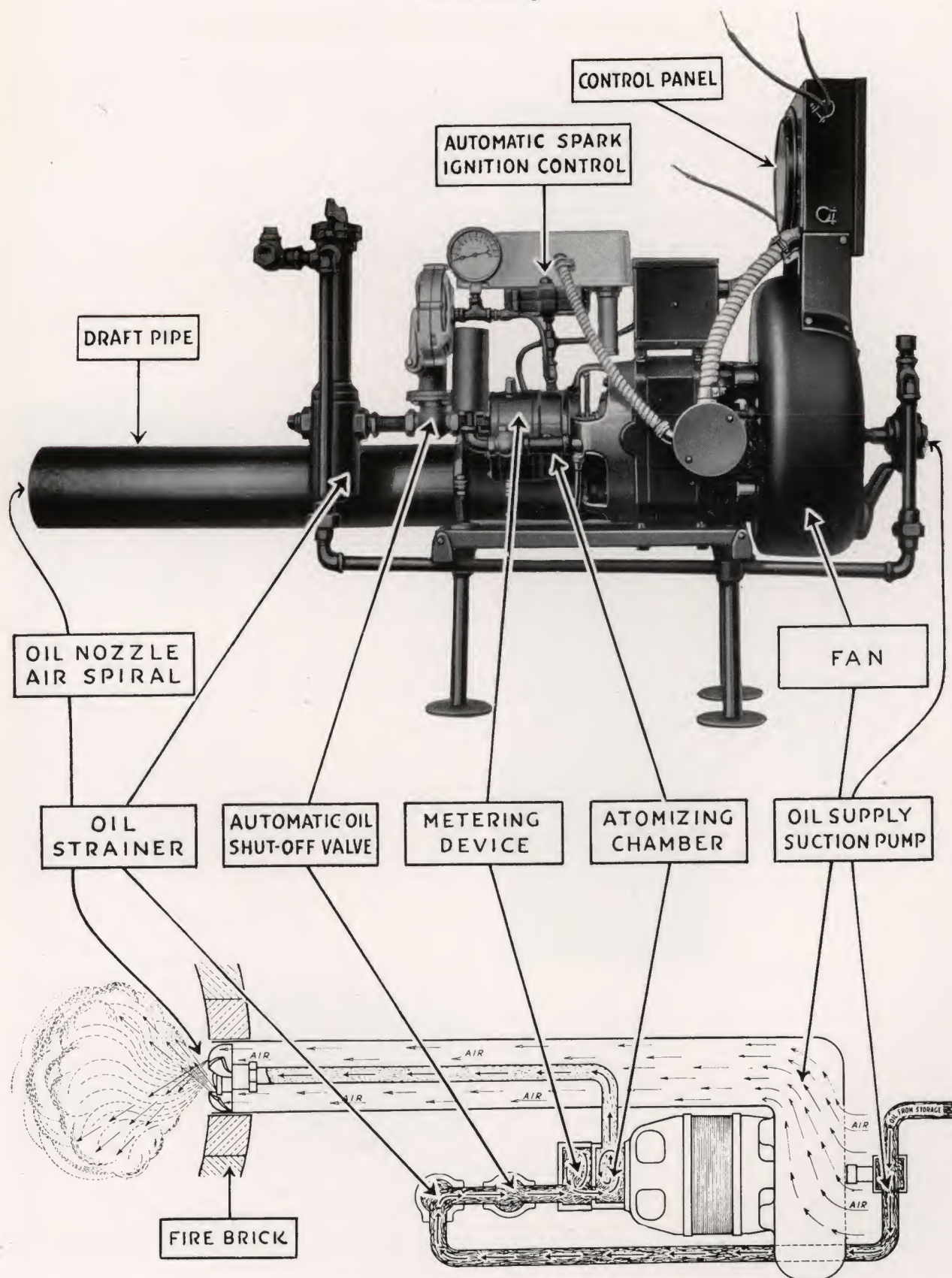
A very effective and unique, automatic draft control in the OIL-O-MATIC eliminates the possibility of a rapid dissipation of the heat stored in a heating plant, when the oil burner shuts down.

The practical value of this OIL-O-MATIC feature is revealed by the attached chart, obtained during a field test of an OIL-O-MATIC installed in the Post Office in Salem, Mass. After closing the valves in the steam main and the return a pressure of 4½ lbs. of steam was created. The OIL-O-MATIC then was shut off. Pressure readings were taken at 10 to 30 minute intervals. As the chart reveals, 6 hours elapsed before the initial pressure of 4½ lbs. was lost.



This test explains why but infrequent OIL-O-MATIC operation is required to maintain a supply of domestic hot water, during the summer months, when the domestic hot water supply system illustrated on page 7 is installed.

The mechanical features of the OIL-O-MATIC draft control are fully described on page 17.

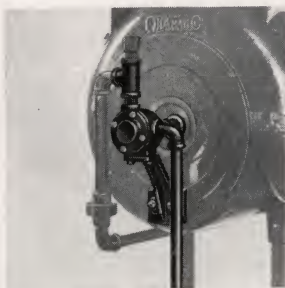


PLAN VIEW OF OIL FLOW

## Function and Detail of Principal OIL-O-MATIC Units

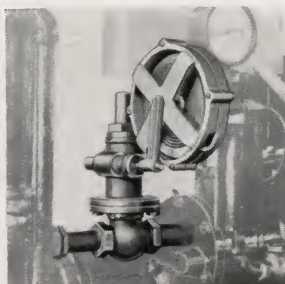
### Suction Pump

This small highly efficient displacement type pump, mounted on the blower housing and coupled direct to the motor shaft thru a flexible coupling, will draw oil 100 feet and lift oil 12 feet, thru a once inch supply line. It transfers oil from outside storage to the inside gravity tank or passes it on to the standpipe and oil strainer, which feeds the automatic shut off valve.



### Automatic Shut Off Valve

This valve automatically shuts off the supply of oil to the metering device, when the OIL-O-MATIC stops operating. A metal bellows, which expands under the slight pressure created in the atomizing chamber, opens this valve. This valve consequently is open only when the burner is in operation.

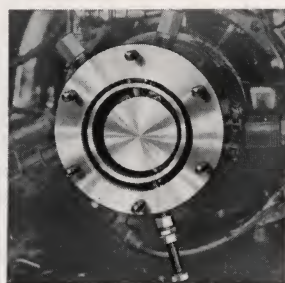


### Metering Device

The heart of the OIL-O-MATIC!

This remarkable device eliminated guess work in the adjusting of an oil burner to the individual requirements of any particular heating plant. This device made possible the burning of Fuel oil (Diesel Oil on the Pacific Coast) in the small fires required for domestic heating plant service. Yet its adjustable capacity, of from less than 1 to 15 gallons of oil per hour, eliminated the necessity of many different sizes of burners, for the wide range of service for which but two OIL-O-MATIC Models are required.

This simple device controls fuel oil flow and once adjusted, it delivers the same measured quantity of fuel to the atomizing chamber, whether the fuel be heavy or light, thick or thin. **Only in this way** can fuel oil, gas oil, distillate or kerosene be burned at will without readjusting the oil burner with every change of fuel.



With an OIL-O-MATIC, oil temperatures likewise may vary, without affecting the size of the flame in the combustion chamber. This is impossible with any valve control or needle valve regulation of fuel oil flow.

The metering device consists essentially of a rotating assembly driven direct from the motor, which contains a displacement type plunger pump. It is operated by its rotary contact with an adjustable eccentric ring. It delivers oil direct to the atomizing chamber, upon which it is mounted, through cored passage in the castings.

All moving parts run in a bath of fresh oil.

### Atomizing Chamber

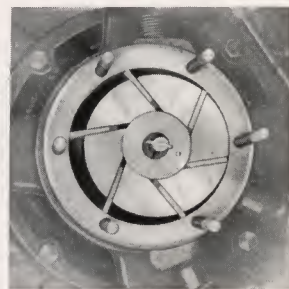
Another exclusive OIL-O-MATIC feature!

The laws of oil burning require that fuel oil be atomized. Heretofore atomizing solid liquid thru a small orifice has required high pressures. High pressures usually breed trouble.

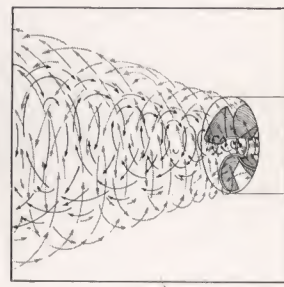
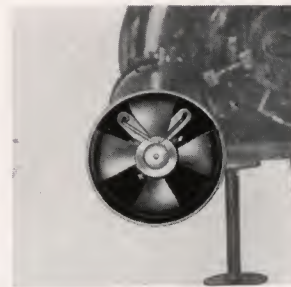
The OIL-O-MATIC method of atomizing eliminated high pressures by first preparing the fuel for atomization. Here in this atomizing chamber a measured volume of fuel oil from the metering device—and air—are churned into a frothy foam, slightly compressed and discharged under a low pressure of from 1¼ to 2½ pounds to the nozzle assembly, where atomization is completed.

The unit consists of a rotor driven direct from the motor, which contains six composition blades. Centrifugal action throws these blades out against the inside of the eccentric cylinder. There are no springs in this assembly.

All moving parts run in a bath of fresh oil.



### Oil Nozzle and Air Spiral



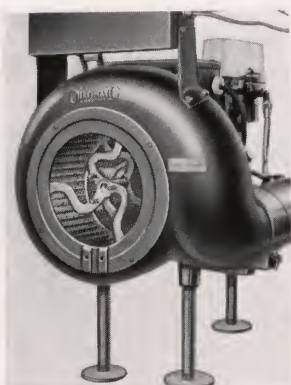
Here the frothy foam of fuel oil from the atomizing chamber is atomized into the air stream from the blower.

The stationary nozzle, in the center of the stationary air spiral, is an orifice 1/16" in diameter rifled on the inside so as to impart a whirling motion, as it atomizes the oil. The air stream from the fan is whirled in the opposite direction, by the stationary air spiral.

Complete atomization of the fuel is obtained in the combustion chamber of the boiler, off the end of this assembly. The fog of highly atomized oil is ignited at this point by electric spark ignition and burns 3/4" to 1" off the end of this assembly. No part of this assembly is in the combustion chamber of the boiler. Possible carbonization of this burner assembly therefore is prevented.

### Fan and Motor

The laws of oil burning require that a fixed minimum of air be positively supplied oil, to support efficient combustion. Naturally this could not be left to chance, stack draft or dampers. So this blower assembly mechanically insures the required air to support efficient combustion.



A sirocco type blower, mounted on an extension of the motor shaft, produces a blast of air that is conducted to the burner assembly by the draft pipe. The motor is a low speed, self-aligning ball bearing type motor. The combination of low speed motor and multi-blade fan eliminates the roar of a high velocity air blast and the hum of a high speed motor.

### Draft Control

This unique device serves three purposes.

1. It retards the velocity of initial blast of air when the burner starts, thereby assisting in the ignition of the atomized oil. 2. It permits control of the air from the blower, so that the proper volume of air is provided for the size of the flame required by the heating plant, in which an OIL-O-MATIC is installed. 3. It automatically closes the draft pipe when the oil burner stops and prevents the passage of a natural draft

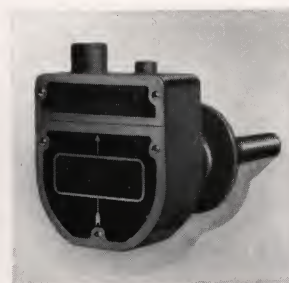


thru the hot combustion chamber, which would rapidly cool the heating plant.

This draft control is a simple butterfly valve or damper. It is opened by the air blast from the blower. It can be adjusted to permit the passage of whatever volume of air is required. A counterbalance weight automatically closes it, when the blower stops.

### Stack Safety Switch

This is the watchdog of an OIL-O-MATIC installation. It is a thermostatic device that opens the motor circuits and stops the burner, should combustion cease for any reason. It also causes the burner to stop in 10-15 seconds, if ignition of the fuel does not occur, when the burner starts. It is wired in series with the other OIL-O-MATIC controls.



### Thermostat and Boiler Controls

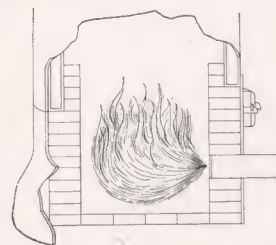


The thermostat, located in some room of the building, regulates room temperatures by automatically operating the oil burner when and as heat is required. This thermostat is wired in series with the proper type of boiler control, which safeguards heating plant temperatures and pressures.

### Combustion Chamber

To comply with the laws of Oil Burning—Here—the finely atomized oil, is mixed with the fixed minimum of air required to support efficient combustion and is burned in suspension, in the presence of a refractory material. The

combustion chamber of a boiler or furnace is always lined with a refractory material when an OIL-O-MATIC is installed. No part of the OIL-O-MATIC is in the combustion chamber.



## Important Details of Oil-O-Matic Installation

The installation of an OIL-O-MATIC complies strictly with all rules and regulations of Local ordinances and the National Board of Fire Underwriters; for the installation of oil burner equipment.

The responsibility for the proper installation of an OIL-O-MATIC is restricted exclusively to dealers, or their installation men, who are trained in the Williams Institute of Heat Research; but certain fundamental requirements are adhered to and so should be understood by those contemplating the installation of an OIL-O-MATIC.

Those important factors pertain entirely to its installation, not the oil burner and are briefly—

### Where An Outside Storage Tank Is Installed

Tank should be of steel, thickness and material as specified by Underwriters Regulations, carrying Underwriters approval label. Openings to consist of fill, vent, suction and return. Tank shall be painted with two coats of asphaltum paint and buried three feet below grade. Outside storage tank should be located not more than 100 feet from the OIL-O-MATIC and the bottom of the tank must be not more than 12 feet below the suction pump on the oil burner. Where tank outlet is above suction pump, an anti-syphon valve, approved by the National Board of Fire Underwriters, must be installed. All piping and the tank hooked up with swing joints, to allow for settling or shifting of the tank.

Outside storage tanks should never be set on cinders, nor should cinders ever be used to fill the excavation in which a tank is located. Cinders produce a corrosive action detrimental to the life of the tank.

### Where Inside Storage Tank Only Is Installed

Tank should not exceed 60 gallons, or of such capacity as to comply with local regulations, and must be located not less than 5 feet from any fire or flame. Tank must be supported by iron pipe or other non-combustible supports. Openings to consist of fill, vent and supply. As no suction pump is used with this installation, supply line connection, at the tank, must be one inch above oil strainer intake on burner.

Avoid glass gauges that permit flow of oil or the escape of vapors in the event of breakage of the glass. Install only magnetic operated or other approved types of gauges on oil storage tanks.

### Piping

Pipe should be galvanized iron pipe. All piping should be assembled with good clean cut threads and joints turned in with a litharge and glycerine compound. All pipe lines to and from outside storage tank should be three feet below grade and in new buildings, inside pipe lines should be run thru sleeves buried in the floor of the boiler room or otherwise installed to comply with local ordinances.

### Wiring

All wiring should be BX or conduit as required by local ordinance. The motor wiring from the service box should be independent of house wiring.

### Oil-O-Matic

The fan end of the OIL-O-MATIC must be set one inch lower than the burner end, to prevent carbonization of the atomizing nozzle. All pipes to burner must be installed so as to be subject to no mechanical strain. A railroad union should be installed between oil strainer and globe valve in the oil supply line, permitting easy removal of the plant without disturbing pipe joints.

### Brick Work

The combustion chamber must be lined with Fire Brick, to be laid with Johns Manville high temperature cement No. 26, or equal; with as small joints as possible.

### Thermostat Control

Common to all heating systems. Thermostat should be installed in a living room, five feet above the floor, removed from warm air registers or radiators. Steam, hot water or hot air pipes must not be located in the wall behind the thermostat.

### Hot Air Furnace Control

Hot air furnaces are equipped with an air jacket thermostat to control temperatures at the furnace.

Note.—In selecting furnace for OIL-O-MATIC installation, care should be exercised to be sure furnace is gas tight.

### Boiler Controls

Hot water, steam and vapor boiler controls are installed on the boiler and control maximum hot water boiler temperatures and steam boiler pressures. These controls are wired in series with the thermostat and stack safety switch.

### Stack Safety Switch

The watchdog of the OIL-O-MATIC installation is installed in the smoke pipe, between heating plant and chimney. It also is wired in series with the previously described controls.

### Regarding Chimneys

One of the principal causes of inefficient heating plant operation is poor draft, due to defective chimneys. With an OIL-O-MATIC fired heating plant, adequate draft is mechanically provided and the only factors to watch are briefly—the flue should be of the same size as would be required to provide adequate draft, if the boiler were fired with coal—it should be as near straight as possible—its height should be sufficient to eliminate all possible downdrafts—the flue should have no connection with other flues or openings. The smoke pipe must not project into the chimney, thereby reducing the efficiency of the flue.

Though not necessary, it is good practice to line the flue with fire brick, laid with a high temperature cement, for several feet above the smoke pipe opening.

### Dampers and Draft Control

All possible obstructions to the mechanical draft produced when the oil burner is operating must be eliminated—therefore, all dampers or draft control apparatus in the smoke pipe or chimney, serving an OIL-O-MATIC fired heating plant, should be removed as required by Underwriters' regulations.

### Feed Water Control

The convenience of OIL-O-MATIC heating encourages inattention. So the heating system, under the stress of hurried visits away from home or other unusual conditions, may at times be forgotten. Though not necessary—caution prompts protection against such neglect, by the installation of an approved low water alarm—or—an automatic water feeder.

## Oil-O-Matic Oil Burners

The adjustable capacity of the OIL-O-MATIC Metering Device, combined with the OIL-O-MATIC control of air, eliminated the necessity for many different sizes of OIL-O-MATIC oil burners for the wide range of service for which but two OIL-O-MATIC models are required.

All parts are interchangeable in both models, with the exception of the motor and a small unit known as the oil spiral.

The model designation indicates the speed of the motor used.

### Model G No. 1200

The smaller OIL-O-MATIC is operated by a  $\frac{1}{4}$  H.P. No. 1200 R.p.m. Baldor induction repulsion type motor. This model is designed for any steam heating system serving 1500 sq. ft. of direct steam radiation or less—any hot water heating system serving 2400 sq. ft. of direct steam radiation or less—or any hot air furnace with a grate diameter of 36 inches or less. This model draws 225-260 Watts and consumes from one to seven gallons of fuel oil per operating hour.

### Model G No. 1800

The larger OIL-O-MATIC is operated by a  $\frac{1}{2}$  H.P. No. 1800 R.p.m. Baldor induction repulsion type motor. This model is designed for any steam heating system serving up to a maximum of 4000 sq. ft. of direct steam radiation—any hot water heating system serving up to a maximum of 6400 sq. ft. of direct hot water radiation—or any hot air furnace with a maximum grate area of 14 sq. ft. This model draws 280-325 Watts and consumes from five to fourteen gallons of fuel oil per operating hour.

OIL-O-MATIC oil burners are built standard, for 110 volt and 220 volt 60 cycle A. C. current and for 110 volt and 220 volt D.C. current, but are also equipped for any other unusual electrical service at a slight additional charge.

Boiler and furnace controls are provided for all types of heating systems.

### Oil-O-Matic Installation in Large Heating Systems

Where the radiation in a building exceeds 4000 feet of direct steam or 6400 feet of hot water radiation and the boiler is of corresponding larger capacity—the speed of the motor and a larger fan provide the larger volume of air and the metering pump is set to deliver the larger volume of oil required to fire the large heating plant.

Frequently, two Model G 1800 OIL-O-MATICS are installed and connected in series so as to operate as a single unit.

## A Specification Which Will Safeguard Oil Burner Performance and Operation

**I**N the selection or specification of mechanical equipment, such as an oil burner, the qualifications of the manufacturer, whose product is under consideration, obviously must be considered.

Many architects consider the following factors of equal importance to the mechanical merit of the product.

1. The financial responsibility and the general business character of the manufacturer.

2. The assurance that production, distribution and service of the oil burner will continue without interruption, into the indefinite future.

3. The record of satisfactory installations.

With such questions satisfactorily answered, the information and data in this book should serve to establish in the mind of architect and engineer, the following convictions regarding those factors that are absolutely essential to the satisfactory performance and operation of any oil burner installation.

1. The Oil Burner must be approved by the National Board of Fire Underwriters' Laboratory to burn 28° Baume fuel oil.

2. The Oil Burner must mechanically control, regulate or meter the flow of oil to the atomizing assembly, so that 28° Baume fuel oil or any lighter oil may be burned, at will, without a change in burner adjustments.

3. The Oil Burner must mechanically atomize oil into the combustion chamber or fire box of the heating plant; where the oil is to be ignited and burned in suspension, before coming in contact with any surface; in the presence of a refractory material.

4. The Oil Burner installation must be provided with complete automatic controls, approved by the National Board of Fire Underwriters; that automatically operate the oil burner so as to safely maintain the desired room temperature; that control maximum temperatures and pressures in the heating plant; that immediately stop the oil burner and the flow of oil to the oil burner, in the event of any irregularities in operation such as failure of oil supply or failure of oil to ignite in boiler.

5. The Oil Burner installation must comply strictly with all the National Board of Fire Underwriters regulations and all local ordinances, and must meet available electric current requirements.

6. The Oil Burner installation must be complete in every respect, tested and ready for service.

7. The contractor shall agree that the oil burner will be of sufficient capacity to operate the boiler (or furnace) continuously, at the manufacturers full rated capacity.

No further detailed study is necessary to safeguard oil burner performance and operation, but for the architect and engineer who may desire a more detailed specification, the following outline may be used.

# Suggested Oil-O-Matic Oil Burner Specification

**SCOPE OF CONTRACT.** These specifications cover the installation of a Fuel Oil Burning apparatus and Oil Storage System, for the boiler installed in.....

The apparatus shall consist of a Model.....OIL-O-MATIC Burner; Fuel Oil Storage (tank) (tanks); room thermostat; boiler control apparatus and safety control; the necessary and adequate installation of the fire brick lining of the combustion chamber of the boiler after removing the grates; all necessary piping, valves, electric wiring and switches, etc.; all tested and ready for service.

The oil burner installation must comply strictly with all the National Board of Fire Underwriters regulations and with local ordinances and must meet available electric current requirements.

These specifications are intended to cover the Oil Burning system installed complete in every respect, in a heating system of sufficient capacity as determined by Standard Heating practice, to properly care for the heating requirements of the building—all according to manufacturers printed instructions and drawings.

**LIABILITY.** The contractor shall assume, etc.

**COMPLETION OF WORK AND PAYMENT.** The work is to be completed, etc.

**MATERIALS.** All materials, etc.

**BOND.** The contractor shall furnish a bond, etc.

**CUTTING AND PATCHING.** The contractor shall do all, etc.

**CLEANING UP.** The contractor shall promptly, etc.

**ADDITIONAL DATA.** All visible OIL-O-MATIC piping and scratched places will be painted to match other new similar adjacent material. Cut and repair all necessary openings.

**OIL BURNER APPARATUS.** The Contractor shall furnish, make all necessary changes in the boiler (or furnace) and install, one completely equipped OIL-O-MATIC Model..... Oil Burner, which is to be equipped with (positive electric ignition)—(combined electric and gas flare ignition).

The fan or blower end of the oil burner must be installed so as to be one inch lower than the burner tip end of the burner assembly. All pipes connected to the oil burner assembly shall be laid so as to be subject to no mechanical strain. A railroad union shall be installed between the oil strainer on the burner assembly and shut off valve in the fuel supply line.

No part of the burner assembly shall extend inside the fire brick lining of the combustion chamber.

**COMBUSTION CHAMBER OR FIRE BOX OF BOILER.** The Combustion chamber or firebox of the boiler (or furnace) shall be lined with FIRE BRICK to be laid with Johns Manville high temperature cement No. 26 or equal with as small joints as possible.

**FUEL OIL STORAGE.** The contractor shall furnish and install (one .....gallon outside and one .....gallon inside) (one .....gallon) fuel oil storage tank(s). Tank(s) to be of material and thickness specified by National Board of Fire Underwriters. Tank openings to consist of fill, vent, suction and return. Tank(s) to be painted with two coats of asphaltum paint.

Outside storage tank shall be buried (where).....so top of tank is at least three feet below grade. All pipes must be connected to tank with lateral swing joints. An anti-syphon valve of a type approved by the National Board of Fire Underwriters shall be installed at highest point in suction or fuel supply pipe.

If gravity feed basement storage tank is used it shall be supported by iron pipe or other non-combustible material, so that supply line connection at tank is at least one inch above oil strainer connection on the oil burner and shall be located not less than five feet from any fire or flame.

Where combined outside and inside storage is used—the two tanks shall be connected by piping and also connected with the suction pump on the oil burner so that the smaller inside storage

tank is at all times filled with oil when there is a supply of oil in the outside storage tank.

**PIPING.** All piping shall be of the best grade of (black malleable) (galvanized steel) pipe. All piping shall be assembled with malleable fittings and good clean cut threads and all joints shall be turned in with a litharge and glycerine compound. Rough in all pipes in or below concrete floors or thru walls and place sleeves where needed, as general contract work progresses.

All pipe lines to and from outside storage tank shall be buried not less than three feet below grade. No piping is to be suspended from the ceiling. All inside pipe lines shall be laid in or below floor of boiler room or otherwise in compliance with local city ordinances.

**WIRING.** All wiring shall be done with BX or conduit, as required by local ordinance and in accord with National Board of Underwriters' Regulations. The motor wiring shall be run from service box, independent of the house wiring.

**THERMOSTAT CONTROL.** (Common on all OIL-O-MATIC Installations) The thermostat shall be installed in ..... room, five feet from floor, removed from any and all warming influences such as radiators, hot water pipes, etc., or possible cooling drafts.

**HOT AIR FURNACE CONTROL.** Furnace shall be equipped with thermostat hot air jacket control, wired in series with room thermostat previously specified in automatically control air jacket temperature.

**BOILER CONTROL.** A maximum (pressure) (temperature) control shall be installed in the boiler according to manufacturers printed instructions. This control shall be wired in series with the room thermostat, previously specified, to automatically prevent creation of (excessive pressure) (boiling temperature) in the boiler.

**AUTOMATIC STACK SWITCH.** Shall be installed, in the smoke pipe between heating plant and chimney, which is to be wired in series with all the previously specified controls, so as to immediately and automatically shut off electric current and oil to the burner if for any reason whatever the oil burner does not function properly.

**DAMPERS AND DRAFT CONTROL.** All dampers or draft control apparatus shall be removed from the smoke pipe and chimney.

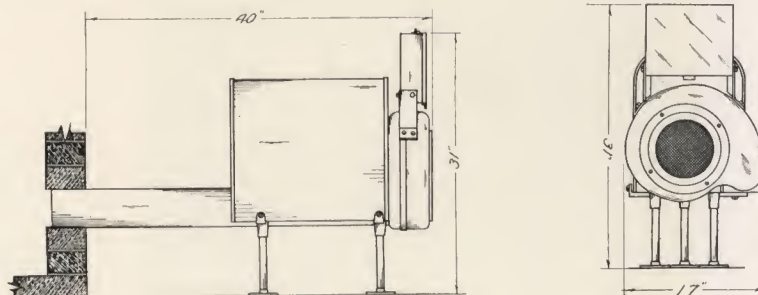
**IN GENERAL.** The omission from these specifications of any minor detail of construction, installation, material, specialties, etc., shall not relieve the contractor from furnishing same in place complete and such omissions shall not entitle contractor to make claims or demands for extra materials or labor.

However, in the event that unusual water is struck or if quick sand, rock or other unusual obstruction are encountered, the contractor shall proceed with the necessary special construction that is involved, for which the contractor will receive a sum equal to the actual cost of such special work plus. . . . The word "cost" as hereinabove used shall be understood to consist of actual field cost and overhead.

**SERVICE.** The contractor shall agree to provide free inspection and service of the OIL-O-MATIC oil burner installation for the first.....days of the first heating season after the installation of the equipment. Said heating season is defined as the period between Sept. 1st to May 1st.

**GUARANTEE.** The contractor shall guarantee to make good by replacement or repair, any original defects in parts, material or workmanship previously specified or described; provided that this obligation is assumed only in the event that written notification of such alleged defect be given the contractor, within a period of one year after said equipment has been installed.

(Complete guarantee clause to comply with local conditions and requirements.)





## Home Builders Everywhere Know Oil-O-Matic

Seven years ago OIL-O-MATIC was unknown.

Today "OIL-O-MATIC" signifies dependable automatic heating, for in the intervening years OIL-O-MATIC Oil Burners have been widely advertised in the leading national publications and metropolitan newspapers. These OIL-O-MATIC advertisements have aroused the interest of the better class of people everywhere.

Today there is hardly a home owner or home builder who does not desire the comfort, convenience and cleanliness that is obtained with OIL-O-MATIC heating of the home.

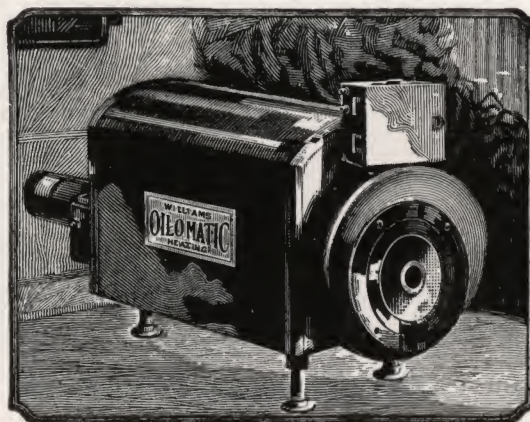
In many sections "OIL-O-MATIC" and "Oil Burner" are synonymous.

Architects can specify OIL-O-MATIC equip-

ment with the assurance that their recommendation will usually obtain the endorsement of everyone concerned with the equipment of the projected new building or home.

Wide spread endorsement of the OIL-O-MATIC Oil Burner however, is by no means the result of powerful advertising alone—yet few people have any knowledge of the intensified constructive organization work which has been going on behind the scenes.

Careful selection and intensified training of OIL-O-MATIC dealers, salesmen, service and installation men has placed Factory trained OIL-O-MATICIANS in practically every city in the country.



## Williams Institute of Heat Research

"No oil burner" says E. J. Smith of Underwriters' Laboratories "is any better than its installation."

Much of the success of any oil burner depends on the efficiency of the heating plant in which it is installed.

This calls for competent heating men whose business it is to inspect and examine the entire heating system—then properly install the OIL-O-MATIC.

To train these men the Williams Institute of Heat Research was created. It is operated under the personal supervision of W. W. Williams, inventor of the OIL-O-MATIC.

Here—under the direction of a corps of engineers—dealers, salesmen, service and installation men are given a thorough schooling in the principles of oil combustion, applied heating, and the installation and operation of the OIL-O-MATIC.

Regular classes are maintained every other week. Branch schools have been periodically held in important metropolitan centers from Seattle, Washington, to Halifax, Nova Scotia.

Such training is for the protection of the OIL-O-MATIC user.

Salesmen so trained make no rash promises. They know exactly what OIL-O-MATIC will do. They promise no more.

Servicemen, who are subject to your call at all times, promptly take care of any minor adjustments that might occasionally be needed.



Williams Institute of Heat Research School of February 15, 1925

Seven years ago the first OIL-O-MATIC was installed in Bloomington, Illinois. The only important changes that have been made since are in appearance. All the principles adopted in 1919 are being followed today. They were fundamental then—they are requisite now.

Back in 1919 the first fully developed OIL-O-MATIC was offered to the public. It is still in operation. At the end of 1925 there were over 30,000 in operation.

The very fact that OIL-O-MATIC has proved itself for seven years satisfies any reasonable man. The magnitude and character of the institution behind it is in itself assurance of satisfaction.

All parts are guaranteed by the Factory for one year against defective workmanship. The OIL-O-MATIC dealer will provide an adequate guarantee that will meet your requirements.

# WILLIAMS OIL-O-MATIC HEATING

## WILLIAMS OIL-O-MATIC HEATING CORPORATION

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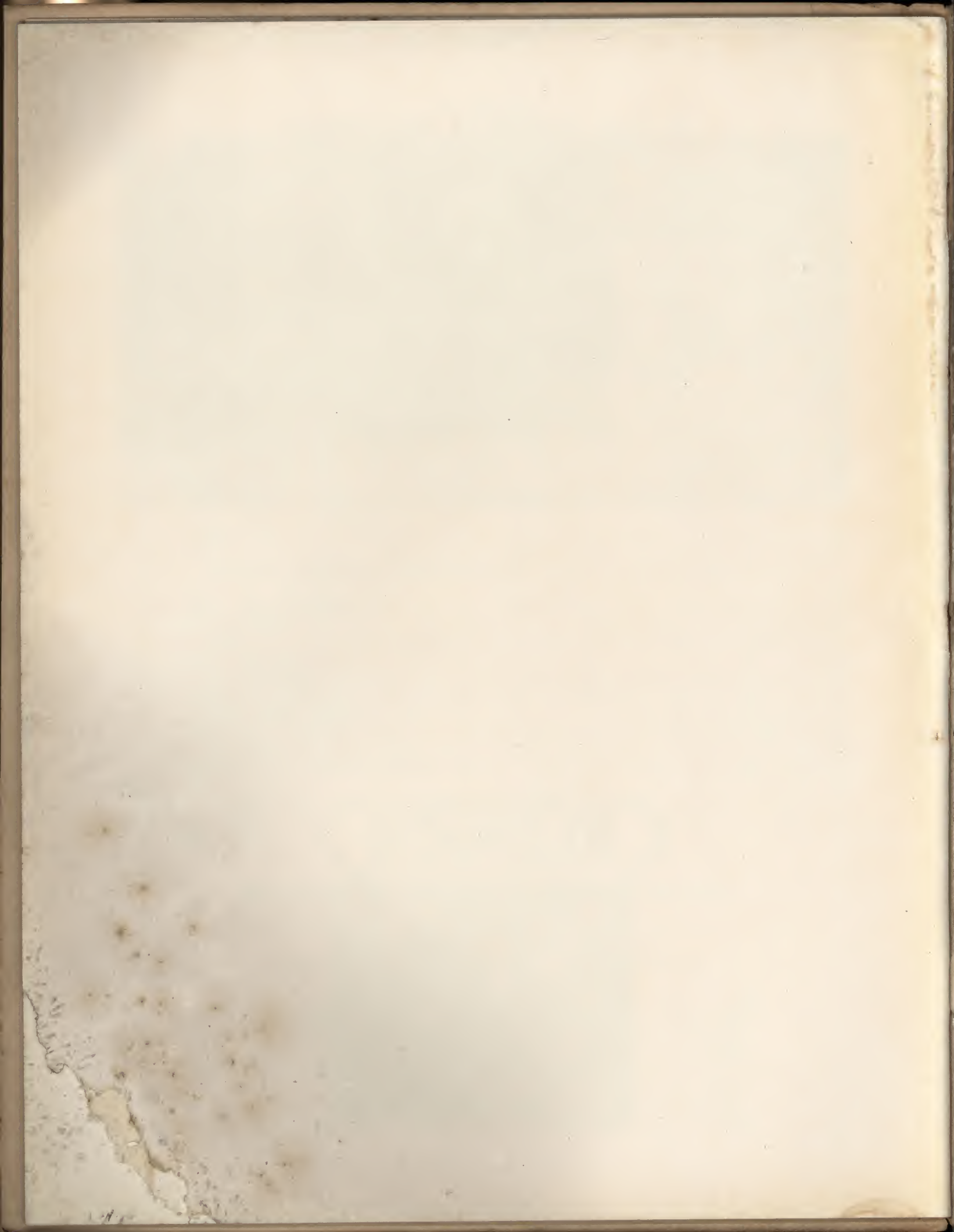
WORLD'S LARGEST PRODUCER OF AUTOMATIC OIL BURNERS

Chicago Office: THE OIL-O-MATIC Co., 185 N. Michigan Ave.  
New York: HERBERT E. WILLIAMS, JR., Co., 101 Park Ave.  
San Francisco: OIL-O-MATIC OF CALIFORNIA

Authorized dealers in every city and town of importance in the United States and Canada.

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